REMARKS

Applicant respectfully requests reconsideration of the present application in view of the reasons that follow.

Interview Summary

Applicant's representative wishes to thank the Examiner for conducting the interview April 20, 2010. In accordance with the request in the Interview Summary that the Applicant file a statement of substance of the interview, please be advised that the Interview Summary accurately summarizes the interview.

Rejection under 35 U.S.C. § 103

Claims 1 and 4-19 are rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Pub No. 2005/0003241 to Derflinger *et al.* (hereafter "Derflinger") in view of Materials Letters 57, 3305-3310, to Yang *et al.* (hereafter "Yang"). This rejection is respectfully traversed. Applicant does not necessarily agree that Yang is prior art and reserves the right to remove Yang as prior art.

Derflinger discloses a metallic intermediate layer 3, a further intermetallic layer 2b, and a slide layer system 4 that includes a slide layer 4a. See Derflinger at paragraphs 0020-0022. The metallic intermediate layers 3, 2b appear to be the same metal as in the hard material layer 2a. See Derflinger at paragraphs 0021 and 0026. Derflinger discloses that the slide layer 4a is formed of a carbide of at least one metal and dispersed carbon. See Derflinger at paragraphs 0022 and 0024. Derflinger further discloses a metal carbide layer 4b between the slide layer 4a and the intermediate layer 3. See Derflinger at paragraph 0027 and Figure 5.

The Office argues on page 2 of the Office Action that the top carbon containing layer of Derflinger, presumably the slide layer 4a formed of a carbide and dispersed carbon, can be optionally replaced with a diamond-like coating, citing paragraphs 0039-0041 of Derflinger. Applicant respectfully disagrees because Derflinger does not disclose or suggest that the slide

layer 4a containing carbide and dispersed carbon can be replaced or substituted by another layer. Instead, Derflinger discloses in paragraph 0040 (emphasis added):

> The slide system 4 may additionally comprise a terminating Carbon layer, especially preferred of a-c:H or DLC without substantial additive of a metallic component.

In other words, Derflinger discloses that the slide system can include a DLC layer as an additional layer, not a layer to substitute another layer, such as the slide layer 4a of carbide and dispersed carbon.

In fact, one of ordinary skill in the art would not have modified the layer system of Derflinger to remove the slide layer 4a of carbide and dispersed carbon, as argued by the Office, because one of ordinary skill in the art would have understood that the slide layer 4a of carbide and dispersed carbon is an important feature for the use of the layer system of Derflinger.

Derflinger states in paragraph 0001 that the layer system of Derflinger is used to coat tools and is particularly suitable for dry processing operations or operations using minimal lubrication. Derflinger discusses the results of several tests in paragraphs 0073-0119 and states in paragraph 0119 that a slide layer system 4 which includes a slide layer of tungsten carbide and dispersed carbon in the tested examples (see paragraphs 0083 and 0106 of Derflinger) exhibits a very low friction coefficient and provides extremely good sliding abilities for the combined layer system.

Derflinger states in paragraph 0007 that it is known, such as in U.S. Patent No. 5,707,748 to Bergmann (hereafter "Bergmann") that layer systems are known which include a hard material layer system and a slide protection layer system, such as a carbide and dispersed carbon. Bergmann states that such layer systems are useful for coating tools and include a hard layer and a friction reducing layer. See Bergmann at col. 1, lines 9-21, and col. 2, lines 36-44. Bergmann states that carbon-based materials are especially suitable for the friction reducing layer, such as carbides dispersed with carbon. See Bergmann at col. 3, lines 3-12. Bergmann states that the examples tested by Bergmann demonstrate that the tested examples

including carbide and dispersed carbon exhibited an improvement in service life with good cutting quality. See Bergmann at col. 3, line 40, to col. 5, line 26.

Based upon the above discussions, one of ordinary skill in the art would have understood that it is important for the slide layer system 4 of Derflinger to exhibit a very low friction coefficient so that the combined layer system would have extremely good sliding characteristics. Further, one of ordinary skill in the art would have understood that the slide layer 4a of carbide and dispersed carbon has a low friction coefficient and serves to improve the friction and sliding characteristics of the slider layer system 4 so that the slide layer system 4 exhibits extremely good sliding abilities, which would be very important for tools used in dry or low lubrication applications, as discussed by Derflinger.

One of ordinary skill in the art would not have been motivated to modify the layer system of Derflinger to substitute or remove the slide layer 4a of Derflinger because one of ordinary skill in the art would understand that the slide layer 4a of Derflinger is vital for providing a low friction layer so that the slide layer system 4 may exhibit good sliding characteristics. One of ordinary skill in the art would understand that such a modification would have rendered the slide system of Derflinger unsatisfactory for its intended purpose (i.e., coating tools for dry or low lubrication applications) and/or would have changed its principle of operation. See MPEP § 2143.01, Parts V and VI, *citing In re Gordon,* 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984) and *In re Ratti*, 270 F.2d 810, 123 USPQ 349 (CCPA 1959). As a result, one of ordinary skill in the art would not have substituted or removed the slide layer 4a of Derflinger, leaving the slider layer 4a in its place.

However, because Derflinger discloses a slide layer 4 that includes a slide layer 4a, Derflinger does not disclose or suggest a substrate covered at least partially with a layered coating comprising, among other things, a transition layer deposited on said second metal layer, said transition layer consisting of at least one carbide of an element of group IVB, group VB or group VIB, as recited in claim 1. Claims 4-19 depend from claim 1.

Applicant notes that it is permissible to use "consisting of" language within a body of a claim under U.S. practice because the "consisting of" language limits only the element set forth in the clause where the "consisting of" language appears. See MPEP § 2111.03.

Derflinger discloses that the slide layer 4a is formed of a carbide of at least one metal and dispersed carbon. See Derflinger at col. 3, lines 2-5, 13-18. In other words, the slide layer 4a would include a metal carbide and dispersed carbon, such as TiC and C or CrC and C, as indicated in examples 2 and 4 of Table 1 of Derflinger. Because the slide layer 4a of Derflinger includes dispersed carbon in addition to the metal carbide and dispersed carbon is not a carbide, the slide layer 4a of Derflinger does not consist of at least one carbide of an element of group IVB, group VB or group VIB, as recited in claim 1.

Nor does Derflinger disclose or suggest a substrate covered at least partially with a layered coating comprising, among other things, a transition layer and a hard carbon coating, wherein said hard carbon coating is deposited directly onto the transition layer, as recited in claim 1.

Instead, Derflinger discloses that the slide layer 4a of metal carbide and dispersed carbon would be on top of the metal carbide layer 4b. See Figure 1, 3, and 5 of Derflinger. Furthermore, Derflinger does not disclose or suggest that the DLC layer would be formed directly on the carbide layer 4b. In fact, one of ordinary skill in the art would have understood that the slide layer 4a would be deposited between the carbide layer 4b and a DLC film of Derflinger to promote adhesion due to the carbide and dispersed carbon composition of the slide layer 4a.

Yang discusses a diamond-like nanocomposite film but does not remedy the deficiencies of Derflinger. Yang does not disclose or suggest removing a carbide and dispersed carbon layer, such as the slide layer 4a of Derflinger, or that such a layer can be substituted by another layer, as argued by the Office.

For at least the reasons discussed above, the combination of Derflinger and Yang does not disclose or suggest all of the features of claim 1. Reconsideration and withdrawal of this rejection is respectfully requested.

Applicant reserves the right to traverse the rejections of the dependent claims, which are allowable over Derflinger and Yang for at least the reasons discussed above and for their respective additional recitations.

For example, Claim 17 depends from claim 1 and is allowable for at least the reasons discussed above. Claim 17 further recites "wherein the diamond-like nanocomposite coating comprises 30-70 at% C, 20-40 at% H, 5-15 at% Si, and 5-15 at% O."

The Office argues on page 4 of the Office Action that it would have been obvious to optimize the composition of the coating of Derflinger and Yang to provide the substrate of claim 17. Applicant respectfully disagrees.

A parameter must first be recognized as a result-effective variable before the determination of the optimal or workable ranges of the variable can be characterized as routine experimentation. See MPEP § 2144.05, Part IIB, *citing In re Antonie*, 195 USPQ 6 (CCPA 1977) and *In re Boesch*, 205 USPQ 215 (CCPA 1980). The Office has not provided any evidence that Derflinger or Yang has recognized the composition of a DLN coating as a result-effective variable. Although Yang discusses the hardness, wear resistance, and adhesion of a DLN coating, the Office has not demonstrated that Yang has recognized the composition of a DLN coating as a result-effective variable. Thus, it would not have been obvious to optimize the coating of Derflinger and Yang to provide the substrate of claim 17, as argued by the Office.

For at least the reasons discussed above, reconsideration and withdrawal of the rejection of claim 17 is respectfully requested.

Conclusion

Applicant submits that the present application is now in condition for allowance. Favorable reconsideration of the application is respectfully requested.

The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by a check being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing or a credit card payment form being unsigned, providing incorrect information resulting in a rejected credit card transaction, or even entirely missing, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741. If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicant hereby petitions for such extension under 37 C.F.R. §1.136 and authorizes payment of any such extensions fees to Deposit Account No. 19-0741.

Respectfully submitted,

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